be disposed just over the central detector region **1714**. Acoustic noise will be cancelled because of the substantially equal and opposite polarization regions provided by the first beam detector region **1704** and the second beam detector region **1706**. The beam can be focused to fall within the central detector region **1714** and used as a beam location detector. Alternatively, the beam can be defocused or made to impinge upon a larger area so that the beam location is not a factor in detecting the radiation beam. Alternatively, the detector electrode can be placed over the entire surface of the electret **1700**. Substantially, equal and opposite surface areas of the electret **1700** are provided so that acoustic noise is substantially nulled. The needle domains **1702, 1712** further function to reduce the effects of noise.

FIG. **18** is a schematic illustration of an electret **1800**. The electret **1800** functions as a detector and has a plurality of needle domains **1802** dispersed throughout the electret **1800**. As disclosed above, the needle domains **1802** function to disperse and otherwise reduce the effects of acoustic noise in the electret detector **1800**.

FIG. **19** is schematic illustration of an electret **1900** that can function as a beam detector and a beam position locator. The electret **1900** is divided into a first domain region **1902** and a second domain region **1904** having opposite polarities. The first domain region **1902** has a positive polarity, while the second domain region **1904** has a negative polarity. The needle domains **1906** disposed in the first domain region **1902** have a negative polarity which is opposite to the polarity of the first domain region **1902**. The needle domains **1908** disposed in the second domain region **1904** have a negative polarity which is opposite to the polarity of the second domain region **1904**. In operation, the needle domains **1906, 1908** function to disburse and otherwise reduce the effects of acoustic noise. Since the electret **1900** is divided into a bicell, the horizontal position of the beam can be detected by determining whether the charges detected are more positive or more negative. The detector electrodes (not shown) are disposed on both sides of the electric **1900** and may be disposed across the entire surface of the electret **1900**. The detector electrodes should cover equal portions of the first and second domain regions **1902, 1904** to insure that nulling occurs from acoustic noise generated in the electret **1900**.

The present invention therefore provides for the use of shadow masks to produce numerous bicells and multiple cell reverse domain region crystals in a simple and inexpensive manner. Further, the use of multiple alternating reverse polarization domain regions on a single crystal has been found to dampen the acoustic waves through physical processes related to the domain region interfaces. Needle domains can also be used to scatter the acoustic waves and thereby reduce the effect of these waves. Proper sizing and shaping of the alternating reversed polarization domain regions allows for the nulling of standing acoustic waves. The size of the alternating domain regions can be determined for various crystals having various aspect ratios, mounting conditions, and other environmental effects using empirical techniques. Further, the size of needle domain regions can be roughly calculated by multiplying the speed of propagation of the acoustic noise through the particular crystal multiplied by the period of the standing wave pattern. Hence, given a particular electret crystal material and the period of the standing wave pattern, the width of the alternating reversed polarization domain regions can be estimated with some degree of accuracy.

The foregoing description of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed, and other modifications and variations may be possible in light of the above teachings. The embodiment was chosen and described in order to best explain the principles of the invention and its practical application to thereby enable others skilled in the art to best utilize the invention in various embodiments and various modifications as are suited to the particular use contemplated. It is intended that the appended claims be construed to include other alternative embodiments of the invention except insofar as limited by the prior art.

What is claimed is:

**1**. A method of reducing acoustic noise in a pyroelectric detector formed from a z-cut single crystal electret comprising:

generating a plurality of domain regions in said electret having opposite polarization directions, said domain regions having a periodic pattern that substantially corresponds to wave patterns of acoustic noise;

providing an electrode that covers approximately equal portions of said plurality of domain regions, so that charges generated by said plurality of domain regions in response to acoustic noise can be combined to substantially null said acoustic noise.

**2**. The method of claim **1** wherein said step of generating a plurality of domain regions comprises:

generating a central circular portion in said electret;

generating a plurality of annular rings around said central circular portion that have alternating reversed polarizations, said annular rings having a width that is an integer value of the wavelength in said electret of at least one source of acoustic noise.

**3**. The method of claim **2** wherein said step of generating a plurality of annular rings comprises:

generating a plurality of annular rings that are an integer fractional value of said wavelength.

**4**. The method of claim **2** wherein said step of generating a plurality of annular rings comprises:

generating a plurality of annular rings that are an integer multiple value of said wavelength.

**5**. The method of claim **1** wherein said step of generating a plurality of domain regions comprises:

generating a plurality of nonuniformly spaced rings having a size that corresponds to standing wave patterns produced in said electret by the interference of reflected acoustic waves and acoustic waves from input noise.

**6**. The method of claim **1** wherein said step of generating a plurality of domain regions comprises:

generating a central portion that is non-circular.

**7**. A method of constructing a pyroelectric detector from a z-cut single crystal electret comprising:

generating a first domain region in said electret having a first polarization;

generating a plurality of needle domain regions having a polarization which is opposite to the first predetermined polarization.

**8**. The method of claim **4** wherein said step of generating a plurality of needle domain regions comprises:

generating a plurality of needle domain regions in an area on said electret that is outside of a central detector region of said electret.

**9**. The method of claim **4** wherein said step of generating a plurality of needle domain regions comprises:

generating a plurality of needle domain regions that are spread throughout said electret.